During the middle decade barometric pressure was unusually high over the Aleutian Islands, which resulted for the most part in fair weather in this district. There were numerous frosty mornings in the North Pacific States and on two or three mornings frost formed in northern California. Warnings for same were issued in every instance.

During the last decade barometric pressure over the Aleutian Islands was relatively low, and rain, with unsettled weather, prevailed for several days in the northern portion of the district, including northern California.

Live-stock warnings were issued on the 24th to places in the North Pacific States, and they were fully verified — *E. A. Beals.*

RIVERS AND FLOODS, APRIL, 1919.

ALFRED J. HENRY, Meteorologist in Charge.

Floods on the Atlantic drainage.—Owing to the light snow cover and the absence of torrential rains, there were no destructive floods in this region during the month. In New England the Connecticut River reached flood stage at two points only, viz, White River Junction, Vermont and Hartford, Conn. The rivers of the South Atlantic States did not reach flood stage, except on the Santee, where a moderate flood prevailed about the middle of the month below the junction of the Wateree and the Congaree. The details are shown in Table I.

East Gulf drainage.—In this district, likewise, only light local floods were recorded. The Tombigbee River of Alabama was above the flood stage on April 2; the Pearl River of Mississippi was above flood stage on April 19. No material damage resulted.

West Gulf drainage.—The upper Trinity was in flood on several days of the month, and the Rio Grande in New Mexico reached flood stage during the last decade of the month.

Mississippi drainage— Mississippi River.—For the third consecutive year there has been no flood of consequence in the Mississippi below Cairo and only light to moderate floods above St. Louis. Agricultural lands along that portion of the stream between Davenport, Iowa, and Louisiana, Mo., suffered more or less by overflow in 1915, 1916, and 1918. In 1918 the Indian Grave Levee broke at a stage of 17.4 feet on the Quincy, Ill., gage. Since a stage of 17.5 feet was reached at Quincy on April 28, much apprehension was felt for the safety of the levees and radical measures were taken to reinforce weak spots.

The natural conditions favorable to high water in this section of the Mississippi are the occurrence of heavy rains extending over two or three days in eastern Iowa or moderate rains extending over a longer period, the run-off from which may or may not synchronize with that from melting snow or heavy rain on the Mississippi drainage above Dubuque, Iowa. The magnitude of the floods will depend largely upon the simultaneity of the run-off from the two regions. The rainfall of the current season has caused high water quite generally in eastern Iowa rivers and along the Mississippi from Dubuque, Iowa, to Louisiana, Mo. The slope of the Mississippi in the stretch from Quincy, Ill., to Louisiana, Mo., is small; therefore flood waters run off slowly. Following is a summary of duration of flood stages taken from Table IV.

Station.	From—	To—
Keokuk, Iowa	Apr. 21	Continued at end of month.
Warsaw, Ill.	Apr. 22	Do.
Quincy, Ill.	Apr. 18	Do.
Hannibal, Mo.	Apr. 13	Do.
Louisiana, Mo.	Apr. 17	Do.

Along the stretch of the river represented by the above-named stations, farming the rich bottom lands is a more or less hazardous proposition. Yet, by reason of the great fertility of the soil, the incentive to take the risk of loss by overflow is so compelling that, except for such times as an early overflow prevents the putting in of crops, the lands are always under cultivation.

The Mississippi below Cairo was at flood stage on the first of the month between Memphis and Arkansas City, Ark. The crest of this rise reached Vicksburg, Miss., on the 15th, and passed thence slowly down stream as a moderate freshet. The only overflow so far recorded was that of about 400 square miles in Mississippi, mostly between the Yazoo and Mississippi rivers.

The lower stretches of the Illinois River were in flood the entire month; that portion above Peoria from the 1st to the 15th. Timely warnings were issued in all cases.

Approximate loss by floods, April, 1919.

District.	Tangible property.	Crops.		Live stock.	Suspension of business.	Money value of warnings.
		Present.	Prospective.			
Davenport, Iowa	$20,000				$2,500	$12,000
Vicksburg, Miss			$40,000			

TABLE I.—*Flood stages in the Atlantic drainage during the month of April, 1919.*

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
	Feet.			Feet.	
Connecticut:					
White River Junction, Vt.	13	12	16	15.5	14
Hartford, Conn.	16	(**)	1	19.8	†30
Hudson:					
Albany, N. Y.	12			10.9	13
West Canada Creek:					
Trenton Falls, N. Y.	8			7.5	12
Santee:					
Rimini, S. C.	12	14	17	12.5	15
Ferguson S. C.	12	16	20	12.2	17-19

** Continued from March. † March.

TABLE II.—*Flood stages in the East Gulf drainage during the month of April, 1919.*

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
	Feet.			Feet.	
Tombigbee:					
Demopolis, Ala.	39	(**)	2	44.4	1
Pearl:					
Jackson, Miss.	20	19	21	21.0	20
Columbia, Miss.	18			17.9	19
West Pearl:					
Pearl River, La.	13	(**)	8	14.9	†27
		16	27	14.3	23

** Continued from March. † March.

TABLE III.—*Flood stage in the Great Lakes drainage during the month of April, 1919.*

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
St. Joseph:	*Feet.*			*Feet.*	
Montpelier, Ohio	10	16	19	12.4	17
Sandusky:					
Upper Sandusky, Ohio	13	.....	.....	11.6	17
Chippewa:					
Mount Pleasant, Mich.	11	.....	.....	9.3	17–18
Grand:					
Eaton Rapids, Mich	5	17	19	5.4	18
Lansing, Mich	11	.....	.....	10.7	18
Grand Ledge, Mich	6	17	19	7.2	18
East Lansing, Mich	8	17	19	9.6	17
Diamondale, Mich	5	.....	.....	4.4	18

TABLE IV.—*Flood stages in the Mississippi drainage during the month of April, 1919.*

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
Scioto:	*Feet.*			*Feet.*	
La Rue, Ohio	11	17	17	11.4	17
Circleville, Ohio	7	.....	.....	6.5	18
Wabash:					
Mount Carmel, Ill.	15	.....	.....	14.8	1
Ohio:					
Cairo, Ill.	45	.....	.....	42.2	1
Mississippi:					
St. Paul, Minn.	14	.....	.....	13.8	22
La Crosse, Wis.	12	.....	.....	11.7	16–17
Stillwater, Wis.	12	(**)	5	13.5	†31
Dubuque, Iowa	18	.....	.....	16.6	22–23
Clinton, Iowa	16	.....	.....	15.4	24
Le Claire, Iowa	10	21	28	10.7	25
Davenport, Iowa	15	.....	.....	13.7	25
Muscatine, Iowa	16	.....	.....	15.8	26
Keokuk, Iowa	14	21	(*)	16.2	27–28
Warsaw, Ill.	17	22	(*)	19.2	27
Quincy, Ill.	14	18	(*)	17.5	28
Hannibal, Mo.	13	13	(*)	17.9	28
Louisiana, Mo.	12	17	(*)	15.8	29
Grafton, Ill.	18	29	(*)	18.6	30
Alton, Ill.	21	.....	.....	20.1	30
New Madrid, Mo.	34	(**)	1	34.3	1
Memphis, Tenn.	35	(**)	3	36.7	1
Helena, Ark.	42	(**)	8	46.2	1
Arkansas City, Ark.	42	(**)	15	49.4	5–6
Greenville, Miss.	42	.....	.....	41.7	5–7
Vicksburg, Miss.	45	4	15	46.0	9–12
Natchez, Miss.	46	.....	.....	45.7	13–14
Baton Rouge, La.	35	.....	.....	34.5	16
Donaldsonville, La.	28	.....	.....	27.0	17
New Orleans, La.	18	.....	.....	17.1	12
Wisconsin:					
Knowlton, Wis.	12	.....	.....	13.4	12
Des Moines:					
Ottumwa, Iowa	10	24	27	12.0	26
Illinois:					
Peru, Ill.	14	(**)	20	17.5	1
Henry, Ill.	7	(**)	(*)	12.9	1
Peoria, Ill.	16	(**)	15	20.0	1
Havana, Ill.	14	(**)	17	17.9	1
Beardstown, Ill.	12	(**)	(*)	19.1	1
Pearl, Ill.	12	(**)	(*)	16.3	1
Grand:					
Chillicothe	18	11	14	21.8	13
Missouri:					
Brunswick, Mo.	10	12	15	11.4	14
Ree, N. Dak.	12	.....	.....	11.1	5
Bismarck, N. Dak.	14	6	6	14.6	6
Kansas City, Mo.	22	.....	.....	20.7	13
St. Francis:					
Marked Tree, Ark.	17	(**)	10	17.1	1–6
Yazoo:					
Greenwood, Miss.	36	.....	.....	34.7	2
Yazoo City, Miss.	25	8	(*)	28.9	17–20
Atchafalaya:					
Simmesport, La.	41	.....	.....	38.2	17–19
Melville, La.	37	13	21	37.4	17–18
James:					
Huron, S. Dak.	9	(**)	4	11.0	1
Little Arkansas:					
Sedgwick, Kans.	18	.....	.....	17.0	29
Cache:					
Jelks, Ark.	9	(**)	10	9.8	1
Sulphur:					
Ringo Crossing, Tex.	20	.....	.....	18.2	19

** Continued from March. * Continued into May. † March

TABLE V.—*Flood stages in the West Gulf drainage during the month of April, 1919.*

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
Trinity:	*Feet.*			*Feet.*	
Dallas, Tex.	25	(**)	2	30.7	1
		9	13	31.5	11–12
Trinidad, Tex.	28	16	19	29.6	18
Sabine:					
Bon Wier, Tex.	20	.....	.....	18.4	1
Guadalupe:					
Victoria, Tex.	16	6	6	18.1	6
Rio Grande:					
Albuquerque, N. Mex.	4	.....	.....	3.8	26–30
San Marcial, N. Mex.	14	22	(*)	15.3	28–30
North Fork, Gunnison:					
Paonia, Colo.	8	.....	.....	7.7	24–25

** Continued from March. * Continued into May.

MEAN LAKE LEVELS DURING APRIL, 1919.

By UNITED STATES LAKE SURVEY.

[Dated: Detroit, Mich., May 5, 1919.]

The following data are reported in the "Notice to Mariners" of the above date:

Data.	Lakes.*			
	Superior.	Michigan and Huron.	Erie.	Ontario.
Mean level during April, 1919:	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Above mean sea level at New York	602.02	581.02	573.05	246.43
Above or below—				
Mean stage of March, 1919	+0.13	+0.28	+0.57	+0.42
Mean stage of April, 1918	+0.58	−0.39	+0.79	−0.74
Average stage for April, last 10 years	+0.45	+0.84	+0.75	+0.09
Highest recorded April stage	−0.67	−2.21	−1.13	−2.00
Lowest recorded April stage	+1.48	+1.80	+1.79	+1.59
Average relation of the April level to—				
March level	.....	+0.3	+0.6	+0.7
May level	.....	−0.3	−0.4	−0.3

* Lake St. Clair's level: In April, 575.88 feet.